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CHURCH OF ST. STEPHEN AT VIENNA.

[View of St. Stephen's Church at Vienna.]

THE city of Vienna, the capital of the empire of Austria, is inferior in extent to most of the other European capitals—the circumference of what is properly called the town being only about three English miles. This is the whole that is surrounded by the ancient walls. The suburbs, indeed, which were also walled round in the latter part of the last century, spread to a considerable distance beyond these limits; but of the space which they cover, a very large portion consists merely of gardens and open fields. Although the whole space occupied by the town and the suburbs is about equal in extent to Paris, the population probably does not exceed three hundred thousand, or little more than a third of that of the French capital.

In ancient times, however, its dimensions were much more contracted; for the Cathedral of St. Stephen, which is now nearly in the heart of the city, is stated to have been originally built without the walls. This is one of the most magnificent monuments of Gothic architecture which now exist. It is three hundred and forty feet in length, by two hundred and twenty in breadth, and eighty in height; but its most remarkable feature is its tower terminating in a pyramidical spire, the height of which is said to be four hundred and thirty, or according to other authorities four hundred and sixty, feet. It rises far above everything else in the city. A staircase conducts to the summit, the number of steps in which is seven hundred; and the view from thence over the extensive and richly-cultivated plain in the midst of which Vienna stands, is described as being one of the finest in the world. This lofty and beautiful tower (for the richness of its architecture equals its surprising elevation) rises from the south side of the church. A similar tower on the opposite side of the church is supposed to have been intended in the original design; and the popular tradition is, that after it had been carried as high as the roof of the church, the builder was thrown from a window and killed by the person who had built the former, and who took this way of preventing his own erection from being equalled or surpassed by his rival. A sculpture in marble, which stands under the pulpit, of a man looking out from a window, is pointed to as the record and evidence of this event; but it is more probable that the story has been made for the sculpture than that the sculpture refers to the story.

Even the bitterest enemies both of the Austrian power and of the Christian faith itself have been won to admiration by the beauty of the tower of St. Stephen's. As in ancient times, at the destruction of Thebes,

> "The great Emathian conqueror bid spare
> The house of Pindarus, when temple and tower
> Went to the ground,"

so the Turkish sultan, Soliman II., when he besieged Vienna, in 1529, gave orders that the cannoniers should carefully avoid touching with their shot this noble spire. In acknowledgment of the sultan's generosity, it was ordered that the crescent and star, the Ottoman arms, should be engraved on one of the highest pinnacles; and there, accordingly, they were to be seen till the last siege in 1683, when Kara Mustapha, by whom the bombardment was carried on, not having observed the same forbearance, they were obliterated. It was on this latter occasion, when the Turkish army, consisting of two hundred thousand men, after having continued the attack for twenty-three days, and brought the city to the brink of surrender, was suddenly fallen upon and cut to pieces by a much smaller force under the command of the great John Sobieski, that a bell was cast for the tower of St. Stephen's from the cannon that were captured. The bell contains above eighteen tons of metal, and is ten feet in height, and thirty-two in circumference.

The first church which occupied the site of the present St. Stephen's, was erected by Duke Henry I., in 1144; but after having been twice burnt down, the edifice was entirely rebuilt in 1270. It was originally dedicated to all the saints; and was not made a cathedral till after the middle of the fourteenth century. About the same time it was repaired and greatly enlarged by Rodolphus IV. The tower, however, is of still later date; all that part, at least, which is above the walls having been certainly erected since the year 1400. The Dukes Abert III. and IV. have the credit of commencing and completing it. (See "Vienna Gloriosa," folio. Vienna, 1703.)

The whole of the cathedral, which is built of freestone, is richly decorated, both externally and in its interior, with figures and other ornamental chiselling in the favourite style of the times in which it was erected. The inside is also adorned by between thirty and forty altars, all of marble, among which the high altar is remarkably splendid. To these are to be added numerous monuments or mausoleums. That of the Emperor Frederic III. is said to have cost forty thousand ducats. Another of great sumptuousness is that of the famous Prince Eugene of Savoy. It was only completed in 1759.

ORIGIN OF THE ROYAL ARSENAL AT WOOLWICH.

THE Goverument Foundry for casting brass ordnance was formerly situated in Moorfields. The process of casting the cannon was then an object of curiosity to the inhabitants of the metropolis, many of whom, of all classes, frequently attended during the operation of pouring the melted metal into the moulds. The injured cannon which had been taken from the French in the successful campaigns of the Duke of Marlborough, amounting to a considerable number, had been placed before the foundry and in the adjacent artillery ground, and it was determined, in 1716, to recast these cannon. On the day appointed for performing this work, a more than usual number of persons were assembled to view the process. Many of the nobility and several general officers were present, for whose accommodation temporary galleries had been erected near the furnaces. Among the company then drawn together was Andrew Schalch, an intelligent young man, a native of Schaffhausen in Switzerland, who was travelling for improvement; he was at the foundry at an early hour, and having been permitted minutely to inspect the works, detected some humidity in the moulds, and immediately perceived the danger likely to arise from the pouring into them of hot metal in such a state. Schalch communicated his fears to Colonel Armstrong, the Surveyor General of the Ordnance, explained his reasons for believing that an explosion would take place, and strongly urged him and the rest of the company to withdraw from the foundry before the casting of the metal. The colonel having closely questioned Schalch on the subject, found him perfectly conversant with all the principles of the founder's art; and being convinced of the good sense which dictated his advice quitted the foundry, together with all those persons who could be induced to believe that there were any grounds for apprehension.

The furnaces being opened, the fluid metal rushed into the moulds, the moisture in which was instantly converted into steam, and its expansive force acting upon the metal drove it out in all directions with extreme violence; part of the roof was blown off, the galleries gave way, and a scene of much mischief and distress ensued. Many of the spectators had their limbs broken, most of the workmen were burnt in a dreadful manner, and several lives were lost.

A few days afterwards an advertisement appeared in the newspapers, notifying that if the young foreigner

who foretold this explosion would call at the Ordnance Office it might prove advantageous to both parties. Schalch being informed, through a friend, of this intimation, lost no time in obeying the summons. Colonel Armstrong had then much further conversation with him on the subject; and became by this means so well assured of his superior ability, that it was finally agreed to intrust Schalch with putting into execution the intention of Government to seek an eligible situation out of the metropolis, and within twelve miles thereof, to which the Royal Foundry should be removed. Schalch, after examining different places, at length fixed upon the rabbit warren, at Woolwich, as suitable to his purpose, and the erection of the works was left to his superintendence.

The first specimens of artillery cast by Schalch were so much approved, that he was appointed Master Founder to the Board of Ordnance, and this office he continued to hold during sixty years, assisted in the latter part of that term by his nephew Lewis Gaschlin. Twenty-five years ago, this nephew, then more than eighty years old, was still employed in the Arsenal as principal modeller for the Military Repository. Schalch died in 1776, at the advanced age of ninety, and is buried in Woolwich church-yard. Some of the largest mortars now remaining in the Arsenal were cast under his direction and bear his name.

It is well worthy of remark that the discernment, which did so much honour to Colonel Armstrong, was fully proved by the fact, that during the whole period in which Schalch superintended the casting of the Ordnance at Woolwich, amidst operations attended with much hazard and difficulty, not one single accident occurred; this fact bears ample testimony to the skill, prudence, and watchful care of "the young foreigner," who owed his rise in life to the judicious and prompt application, at a critical moment, of the knowledge he had acquired.

MINERAL KINGDOM.—Section 11.

Organic Remains.—(*Continued.*)

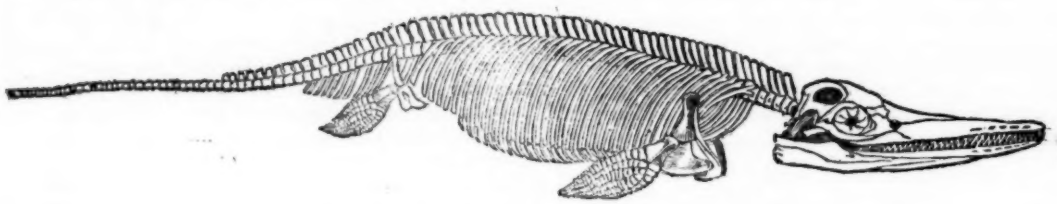
In our last section we gave some examples of remarkable species of fossil-shells, corals and crustacea; two of these, the trilobite and the lily-encrinite, belonging to genera which became extinct after the deposit of the oldest secondary strata. In the extensive series of sand-stones, lime-stones, and clays of the secondary rocks, from the coal measures up to and including the chalk, (see diagram in No. 51, Jan. 19, 1833,—G to M,) the fossil remains of animals consist of a vast variety of shells, corals, sponges, and other marine productions of a similar description,—of a few kinds of crustacea, that is, animals having a crust or shell like that of the lobster or crab, a few kinds of fish, some great reptiles, and a few insects. No remains of land-quadrupeds, or of the marine mammalia, (sea-animals which give suck to their young, such as whales,) or of birds, have yet been met with in chalk or any stratum under the chalk, except one instance of the jaw of a small quadruped found by Dr. Buckland in a quarry near Oxford. Among the numerous animal remains that occur in the secondary strata, there is not a single species which has not been for many ages extinct, and even whole genera have totally ceased to exist.

The extinction of species is so important a fact in all that relates to the geological history of the earth, that we will, even at the risk of some repetition, endeavour, by a little popular explanation, to make clear to the general reader what is meant by the term. Each particular kind or *genus* of animal usually consists of several individuals which, while they possess a common character or class of characters, have particular forms which distinguish them from each other, and such individuals constitute the *species* of a *genus*. The characters by which geologists distinguish the relative ages of strata, in so far as animal remains are concerned, depend, not upon the *genus*, but on the *species*; for while species have become extinct, one after the other in succession, the *genera* to which they belong have continued to exist from the period of the deposition of the oldest of the secondary strata to the present time. For example, the *genus* ostrea, or oyster, is found in the lime-stones which lie beneath the coal-measures, but not one of the many *species* of oyster which are met with in almost all the strata, from that lime-stone up to the chalk, is identical with any species of oyster inhabiting our present seas.

It is unnecessary for us to give the names of the marine remains which are most abundant in the secondary strata, because, even with the assistance of figures, they would convey to the general reader no clear idea of their peculiar forms, as distinguished from those of marine shells, corals, sponges, &c., now existing; but some of the marine reptiles are so extraordinary in point of form and size as to deserve a more particular notice. Of these monsters of the ancient seas, nine different genera have already been found entombed in the secondary strata, and of some of the genera there are several species. They have been called *saurians* by geologists, from the resemblance they bear to the lizard tribe, *saura* being the Greek name for a lizard. A common green lizard is a tolerably good miniature representation of the general form of the reptiles we speak of; but a crocodile or alligator gives a still better idea of them. It must be remembered, however, that in speaking of the fossil remains of those animals, we mean only their skeletons or bones: the flesh is never converted into a fossil state. It very seldom happens, also, that the entire skeleton of any large animal is found, particularly in the strata that were deposited at the bottom of a sea, and for this reason: the bones in the living body are kept together by a cartilaginous substance or gristle, which after death putrefies, and then the several members fall asunder. Very often, too, we find only detached bones; and this may be accounted for by another circumstance attending the process of putrefaction. When that commences in a dead animal, a considerable quantity of gas is generated, which swells up the body, and, if that be in water, makes it so much lighter that it floats. In process of time the skin bursts, and the gradually loosened bones are scattered far apart. Such detached bones are frequently all by which we are enabled to decide upon the nature of the animal; and the general reader may, perhaps, think that they are sufficiently scanty materials, considering the important conclusions which geologists sometimes draw from them. But the discoveries of philosophers, who have occupied themselves in comparing the anatomical structure of the lower animals with that of the human frame, and have created the interesting and beautiful department of science called Comparative Anatomy, have enabled them to establish certain fixed and invariable principles for our guidance in this curious branch of geological inquiry. This field of investigation has only been entered upon within a few years; but it has already yielded so rich a harvest, that it has established some of the most important truths connected with the past history of our planet. The great discoverer of those general laws of the animal kingdom was the illustrious French naturalist, the Baron Cuvier, who died last year. He has shewn that there reigns such a harmony throughout all the parts of which the skeleton is composed, so nice an adaptation of the forms to the wants and habits of the animal, and such a degree of mutual subordination between one part and another in portions of the structure apparently quite unconnected, that we are enabled by the inspection of a single bone to say with certainty that it must have belonged to a particular kind of animal, and could not have formed a part of the skeleton of any other. Thus,

if we present to a skilful comparative anatomist a small bone of the foot of a quadruped, he will not only pronounce with certainty as to the size of the animal to which it belonged, but will say what sort of teeth it must have had,—whether it had horns, and whether it fed upon the flesh of other animals or on vegetable substances. If many detached bones belonging to the same kind of animal be collected, the skill of the comparative anatomist enables him to put them together in their true places, and thus a complete skeleton has been constructed of separate fossil bones which had belonged to several individuals of the same species. In this application of anatomy to geology we have a beautiful illustration of the intimate connexion of the sciences with each other. The discovery, in one of our stone-quarries, of a few mutilated fragments of bone imbedded in the solid rock, reveals to us the kind of animals that must have inhabited this region of the earth at the remote period when the rock was in the act of being deposited at the bottom of the sea, and tells us also that the climate was not that of the temperate zone but of the tropics.

The most remarkable of the fossil saurians which are found in the secondary strata are those which have been called ichthyosaurus, plesiosaurus, megalosaurus, and iguanodon. The first of these is so called from the characters of the animal partaking at the same time of the nature of a fish and of the lizard tribe; *ichthys* and *sauras* being two Greek words signifying fish and lizard. Its head resembles that of a crocodile, only it is much larger and sharper, its snout ending in a point, almost as acute as the beak of a bird: it has a most formidable supply of sharp conical teeth, no less than sixty in each jaw. Its head was of an enormous size, for jaws measuring eight feet in length have been found; and it was furnished with a pair of eyes of still more extraordinary proportion, for the oval hollows for that organ in a skull belonging to a gentleman at Bristol measure fourteen and a half inches in their largest diameter, the size of a dish on which a tolerably good-sized turkey could be served up. The head was about a fourth of the whole length of the animal, and was joined to the body by a very short neck: the back-bone was composed of joints or *vertebræ* different from those of land animals, and similar to those of fishes: it was supplied with four paddles like those of a turtle, in the lower part of its body, and by means of these and its very powerful tail it must have darted very swiftly through the water. It was a most singular combination of forms, for it had the snout of a dolphin, the teeth of a crocodile, the head and breast-bone of a lizard, extremities like the marine mammalia, and vertebræ like a fish. We can, however, form no idea of the appearance of the animal when alive, except such as is conveyed to us by the sight of the skeleton; a very imperfect one, no doubt, as we know by the difference between any animal and its skeleton placed beside it. The following representation of the complete skeleton of the ichthyosaurus, as restored in the way we have alluded to, is given by the Reverend W. Conybeare, the eminent geologist to whom we are indebted for the most complete account of these fossil saurians.—(*Transactions of the Geological Society*, vol. i. Second Series.)



[Skeleton to Ichthyosaurus Communis, restored by Mr. Conybeare.]

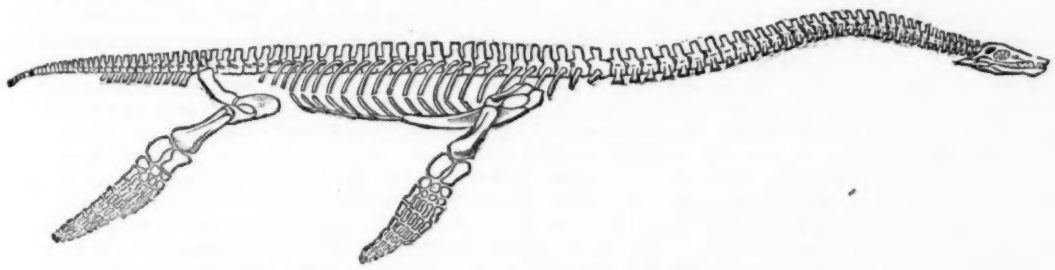
Remains of the ichthyosaurus have been found in all the secondary strata, between the red sand-stone and the chalk (G to K,—diagram quoted above) in many parts of England; but they are most frequently met with in the lias lime-stone, (I, *f*,) and in greatest abundance at Lyme Regis in Dorsetshire. They have also been found in several places on the continent, especially in Wurtemberg.

The *plesiosaurus* is so called from its near approach to the lizard tribe, *plesion* being Greek for *near*. It has a considerable resemblance in the body to the ichthyosaurus, but the head is much smaller, and is altogether of a different structure; but its most remarkable character is the great length of its neck. In man, all quadrupeds and other mammalia, there are exactly seven joints or vertebræ in the neck; and so strict is the

[Skeleton of the Plesiosaurus Dolichodeirus, in the position in which it was found at Lyme Regis.]

adherence to this rule, that there is precisely the same number in the short, stiff neck of the whale, and the long, flexible neck of the giraffe. Reptiles have from three to eight joints,—birds many more; the swan, which has the most, is enabled to make the graceful curves of its neck by being provided with twenty-three of those separate vertebræ; but the plesiosaurus had no less than forty-one. In order to convey to our readers an idea of the state in which fossil-bones are found, we have given a representation of a plesiosaurus, found in 1823 at Lyme Regis; but we must remark that, mutilated as it seems, it is rare to find bones lying so nearly in the form of the skeleton as those are. The specimen occurred imbedded in the shale or slaty clay, which lies between the beds of lias limestone, and the skeleton has been crushed almost flat by the vast weight of stone lying above it.

Mr. Conybeare, to whom we are indebted for the first description and name of the plesiosaurus, has given us the following representation of this extraordinary long-necked reptile, in a restored state, in the same way as he has given us a figure of the ichthyosaurus.



[Skeleton of the Plesiosaurus Dolichodeirus, restored by Mr. Conybeare.]

Megalosaurus.—Some fragments of the bones of a saurian of gigantic size were discovered by Dr. Buckland a few years ago in the quarry of Stonesfield, near Woodstock, in Oxfordshire. According to the opinion of Cuvier, who examined them, they must have belonged to an individual of the lizard tribe, measuring forty feet in length, and having a bulk equal to that of an elephant seven feet high. This fossil animal was distinguished by Dr. Buckland with the above name on account of its great size, *megale* being Greek for great.

The other great fossil saurian we have mentioned is the iguanodon which was found in Sussex; but as an account of it has been already given in this "Magazine," (No. 52, Jan. 26, 1833,) we refer our readers to that description.

A most curious discovery was made a few years ago by Dr. Buckland at Lyme Regis.

He had often remarked a number of long rounded stony bodies, like oblong pebbles or kidney potatoes scattered on the shore, and frequently lying beside the bones of the saurians when these were discovered in the rock. He was induced to make a closer examination of them, and they turned out to be the *dung* of the saurian reptiles in a fossil state. When found along with the bones they are always under or among the ribs. Many specimens of them contained scales, teeth, and bones of fishes that seem to have passed undigested through the body of the animals; just as the enamel of teeth and fragments of bone are found undigested in the dung of the ravenous hyæna. It was thus shown that these great monsters of the deep fed not only on their weaker neighbours, but sometimes even on the smaller defenceless individuals of their own species; for Dr. Buckland found in one of these stones a joint of the back-bone of an ichthyosaurus that must have been at least four feet in length. He has called the stones *coprolites*, from *kopros*, Greek for dung, and *lithos*, a stone. Since his attention was directed to the subject, he has found similar bodies in many other strata, and belonging to different animals. "In all these various formations," he says, "the coprolites form records of warfare waged by successive generations of inhabitants of our planet on one another; and the general law of nature, which bids all to eat and to be eaten in their turn, is shown to have been co-extensive with animal existence upon our globe, the *carnivora* in each period of the world's history fulfilling their destined office to check excess in the progress of life, and maintain the balance of creation."

Before proceeding to speak of the more remarkable forms of organic life preserved in the tertiary strata, or those which lie superior to the chalk, we shall, in our next section, give a brief account of the *Fossil Flora* of the older sedimentary deposits of those remains of the vegetable kingdom which are found throughout the whole of the secondary strata, and, in some of them, in vast accumulations.

OLD TRAVELLERS.—MARCO POLO.—

(*Conclusion.*)

The dramatic scenes and adventures of our old traveller's life were not destined to end with his return to Venice. On the arrival of the Poli there, they found that their fellow-citizens had long numbered them with the dead; and their mansion was in the occupation of some distant relations, who were long before they could recognize, after so many years' absence, the returned travellers as members of the Polo family. To make themselves known to their forgetful relations, and at the same time to impress all Venice with a proper notion of their identity, wealth and importance, the Poli gave a magnificent entertainment in their own house. When the numerous guests were assembled, the three travellers entered, clothed in long robes of crimson satin. When water had been carried round for the washing of hands, and the guests shown to their seats, they changed these costly vestments for similar ones of crimson damask; these again they changed after the first course had been removed, for robes of crimson velvet; and at the conclusion of the banquet they doffed their velvet, and appeared in such plain suits as were worn by the gentlemen of Venice. The robes of satin, of damask, and of velvet, were taken to pieces and their materials distributed among the attendants. Then, when the dinner-table had been uncovered, and the domestics ordered to retire, Marco proceeded to an inner apartment, and presently returned with the three coarse thread-bare garments in which they were clad when they first sought admittance into their own house. They ripped open the seams, linings, and patches of these humble dresses, and brought to view such a quantity of diamonds and other precious stones as dazzled both the eyes and the imagination of the beholders. At the display of such incalculable wealth the company was at once convinced that these were indeed "the honourable and valiant gentlemen of the house of Polo,"—all doubts vanished, and the hosts were treated with profound respect.

Not many months of tranquillity had, however, elapsed, when an hostile Genoese fleet, commanded by Lampa Doria, threatened some of the Venetian possessions on the opposite coast of Dalmatia. The galleys at Venice immediately put to sea under the orders of Andrea Dandolo; and the adventurous Marco, as a patriotic citizen, and an experienced seaman, took the command of one of them. The fleets soon met: Marco foremost of the advanced division, gallantly threw himself among the enemy; but he was not properly supported by his countrymen, and after receiving a wound, was obliged to surrender to the Genoese. The Venetians were defeated with great loss, and besides Marco Polo, Andrea Dandolo their admiral was among the number of prisoners taken by Doria.

From the Dalmatian coast Marco was carried to a prison in Genoa; but his fame had probably preceded him thither, and, as soon as he was personally known, he received every possible respect and attention, having all his wants liberally supplied, and the place of his detention, instead of a solitary and wearisome confinement, being daily crowded by the gentlemen of Genoa, who were as curious as those of Venice. Here, tired, as it is said, by being obliged so frequently to repeat the same stories, he first determined to follow the advice of those who urgently recommended him to commit his travels and adventures to writing. Accordingly he procured from his father at Venice all the notes he (Marco) had made on his different journeys. From these original documents, and from verbal additions to them, Rustighello or Rustigielo, a gentleman in the Venetian service, who was in the daily habit of passing many hours with him, drew up the narrative in Marco's prison. The manuscript is supposed to have been finished and circulated in the year 1298.

Marco's captivity deeply afflicted his father and uncle, whose fondest hopes were to see him suitably married at Venice, and become the father of sons who should continue the name and inherit the wealth they had accumulated. They petitioned and offered large sums of money to the Genoese for his liberation, in vain. It was not till after a lapse of four years, in consequence of the exertions in his favour of the noblemen and indeed of the whole city of Genoa, that Marco obtained his liberty and returned to Venice. He then married, and had two daughters.

When Nicolo died full of years and honours, his pious and affectionate son erected a stately monument to his memory "under the Portico in front of the church of St. Lorenzo, upon the right-hand side as you enter.*" Ramusio, who wrote about the middle of the sixteenth century, says that this monument was still to be seen there. When Marco himself was gathered to his fathers cannot be precisely ascertained, but his "last will and testament" bears the date of 1323; and he probably died shortly after, at the good age of seventy years. According to Sansovino, Marco also had a tomb under the portico of the church of St. Lorenzo. At present neither the tomb of Nicolo nor that of Marco can be found in Venice.

People did not wait for the death of Marco Polo to question his veracity, and to treat the narrative of his travels with ridicule. Even in his native city, and not long after his return, he was nicknamed "Marco Milione," (Mark Million†,) from his frequent use of that high numerical term in speaking of the immense population and the revenues of the Tartar-Chinese empire. It is also reported that when he lay on his deathbed, some of his scrupulous friends entreated him, as a matter of conscience, to retract such of his statements as appeared to them fictitious; and it is added that the old traveller indignantly rejected their advice, protesting that, instead of exceeding the truth, he had not told half of the extraordinary things he had seen with his own eyes. But after his death he was treated with still greater disrespect by an ignorant populace. In the masquerades during the Carnival the Venetians always had for one character a "Marco Milione," and this buffoon amused the mob by telling whatever extravagant tale came into his head. When Marco wrote, Italy was far from having recovered from the losses she sustained at the dissolution of the Roman empire; her population, moreover, was divided into a number of paltry states;—the very recollection of what had been the extent of the empire of which they once formed part seems to have been forgotten, and people turned with doubt from the traveller's account of the hundreds of cities, and millions of inhabitants, in China. The exaggerations of fear and hatred had represented the Tartar tribes that had overrun a good part of the western as well as the eastern world as little superior to wild beasts: how then could they believe that this very race, in Tartary and China, were highly civilized, living under a regular government, having magnificent cities, manufactures, and a commerce compared to which that of Venice (then the most considerable in Europe) sank into utter insignificance?

Marco Polo had also the misfortune to write long before the use of printing; and during a century or more, the manuscript copies made of his work were liable to all the errors of careless and ignorant transcribers. He was afterwards translated into different European languages by those who were evidently ill acquainted with the idiom in which his Travels were written*, and lamentably ignorant of geography and the physical sciences. These translations were again translated and errors heaped upon errors. Thus, in English, Hakluyt, who was one of our earliest collectors of travels, gave an account of Marco Polo's from an incorrect Latin version he had somewhere picked up; "and here," as Purchas says, "the corrupt Latin could not but yield a corruption of truth in English."

At last, in 1559, more than two centuries after Marco's death, something approaching to justice was done him by his countryman Ramusio, who published a corrected Italian version of his narrative, in the second volume of his Collection of Travels. Purchas used this translation, and made Marco Polo more popular in England†. Robertson, Gibbon, and Vincent, also preferred Ramusio to all other editors and translators. Numerous other editions and translations continued to be made in different parts of Europe; but it was not till 1818 that full justice was done to Marco Polo by our countryman Mr. William Marsden, whose book (then first published) is altogether one of the most remarkable that have been produced in our days‡. This volume contains the results of many years of labour devoted to the task of validating the authority of the old traveller; and from the mass of evidence thus collected, has established beyond a doubt that the long-calumniated Venetian is most remarkably correct whenever "*si dice*," or "it is said," is not introduced. When these words occur, Marco is only telling what was told to him, and must, as we have before said, be listened to with reservation. By this remarkable volume (to use a favourite oriental idiom) the face of Marco Polo has been whitened.

* Ramusio. The church of San Lorenzo stood on one of the islets of Venice called "I Gemelli" or "The Twins."

† When Ramusio wrote, the house at Venice where Marco had lived was still called "*La Corte del Milione*."

* This appears to have been the Venetian dialect, which was very different then, as it is now, from the Tuscan, or literary language of Italy.

† Purchas published his Collection of Travels in the beginning of the seventeenth century.

‡ "The Travels of Marco Polo, a Venetian, in the thirteenth century: being a Description, by that Early Traveller, of Remarkable Places and Things in the Eastern Parts of the World. Translated from the Italian, with Notes, by William Marsden, F.R.S., &c. London, 1818."

FATA MORGANA, IN THE BAY OF REGGIO.

Reggio is a considerable town in Calabria, most beautifully situated on the Faro, or Strait, of Messina, which separates Italy from the island of Sicily, and has at that point the appearance of a majestic river. The neighbourhood is rich in choice and most varied productions; continuous groves of orange, lemon, and citron trees extend for several miles on either side the town, which is backed by a grand range of mountains, whence descend numerous rivulets that refresh and fertilize the soil. The Sicilian shores, with the fair city of Messina and numerous white villages, and mountains of the most picturesque forms in the distance, face this terminating point of Calabria. The dark-blue sea, which flows through the narrow channel with a rapid current, purifies the air and causes a gentle refreshing breeze that rarely fails, and is felt most deliciously during the summer heats.

"Do you know," says Brydone to his correspondent, "that the most extraordinary phenomenon in the world is often observed near to this place? * * * It has often been remarked, both by ancients and moderns, that in the heat of summer, and after the sea and air have been greatly agitated by winds, and a perfect calm succeeds, there appears about the time of dawn, in that part of the heavens over the straits, a vast variety of singular forms, some at rest, and some moving about with great velocity. These forms, in proportion as the light increases, seem to become more aërial; till at last, some time before sunrise, they entirely disappear*."

The phenomenon which the traveller here rather incorrectly describes, is called the Fata Morgana, or the Fairy Morgana; a name not altogether inappropriate, when we consider the magical, fairy-like effects produced. After saying that the philosophers of the country were puzzled to account for the causes of these effects, Brydone continues, "Some of them think they may be owing to some uncommon refraction or reflection of the rays from the water of the straits; which, as it is at that time carried about in a variety of eddies and vortexes, must of consequence, say they, make a variety of appearances on any medium where it is reflected." From this reasoning, which is not very satisfactory, the traveller dissents, and proposes a theory of his own. He thinks the phenomenon somewhat of the nature of the aurora borealis, and dependent on electric causes. "Electrical vapour," says he, "in this country of volcanoes is produced in much greater quantities than elsewhere. The air being strongly impregnated with this matter, and confined between two ridges of mountains, at the same time exceedingly agitated from below by the violence of the current and impetuous whirling of the waters, may it not be supposed to produce a variety of appearances?" This mode of accounting for the phenomenon is very vague; nor are Mazzi, Angelucci, and other native writers, much clearer. They say that to produce the effect a dead calm is necessary; that the motion of the current in the straits must cease, and the waters rise above their ordinary level; that this must take place at a time of the day when all the objects on the shore are reflected in colossal forms in the sea; that then the undulating changes of this marine mirror, cut into facets, repeat in a thousand different shapes all those images; and if the air be at the same time charged with electric matter, these multiplied objects are reflected in the air also.

A more scientific explanation was attempted in 1773 by Antonio Minasi, a Dominican friar, who informs his readers that he *saw* the phenomenon three several times, and so beautiful was it, that he would rather behold it again than the most superb theatrical exhibition in the world. The friar says, "When the rising sun shines from that point whence its incident ray forms an angle of about 45° on the sea of Reggio, and the bright surface of the water in the bay is not disturbed either by the wind or the current, the spectator being placed on an eminence of the city, with his back to the sun and his face to the sea—on a sudden he sees appear in the water, as in a catoptric theatre, various multiplied objects, *i. e.* numberless series of pilasters, arches, castles well delineated, regular columns, lofty towers, superb palaces with balconies and windows, extended alleys of trees, delightful plains with herds and flocks, &c., all in their natural colours and proper action, and passing rapidly in succession along the surface of the sea, during the whole short period of time that the above-mentioned causes remain. But if, in addition to the circumstances before described, the atmosphere be highly impregnated with vapour and exhalations not dispersed by the wind nor rarefied by the sun, it then happens that in this vapour, as in a curtain extended along the channel to the height of about thirty palms and nearly down to the sea, the observer will behold the scene of the same objects not only reflected from the surface of the sea, but likewise in the air, though not in so distinct and defined a manner as in the sea. And again, if the air be slightly hazy and opaque, and at the same time dewy and adapted to form the iris, then the objects will appear only at the surface of the sea, but they will be all vividly coloured or fringed with red, green, blue, and the other prismatic colours."

The singular effect last alluded to will be comprehended by a glance at our cut; and the reader will perceive, that as the rigging of the ship there is surrounded by the fringe, the beautiful rainbow colours attach to direct rays from objects as well as to the reflections of objects. When this phenomenon, which is of rare occurrence, makes its appearance, the people hail it with exultation and joy, running down to the sea side, clapping their hands and exclaiming, "Morgana! Morgana! Fata Morgana!" The Dominican, in his explanation, says, the sea in the Strait of Messina has the appearance of a large inclined speculum; that in the alternate current which flows and returns in the channel for six hours each way, and is constantly attended by an opposite current along shore to the medium distance of about a mile and a half, there are many eddies and irregularities, especially at the time of its change of direction; and that the Fata Morgana usually appears at *this* period. He then shows what must be the relative position of the sun and moon, necessary to afford high water at the proper time after sunrise, to meet the other peculiar circumstances necessary for the formation of the beautiful and evanescent vision.

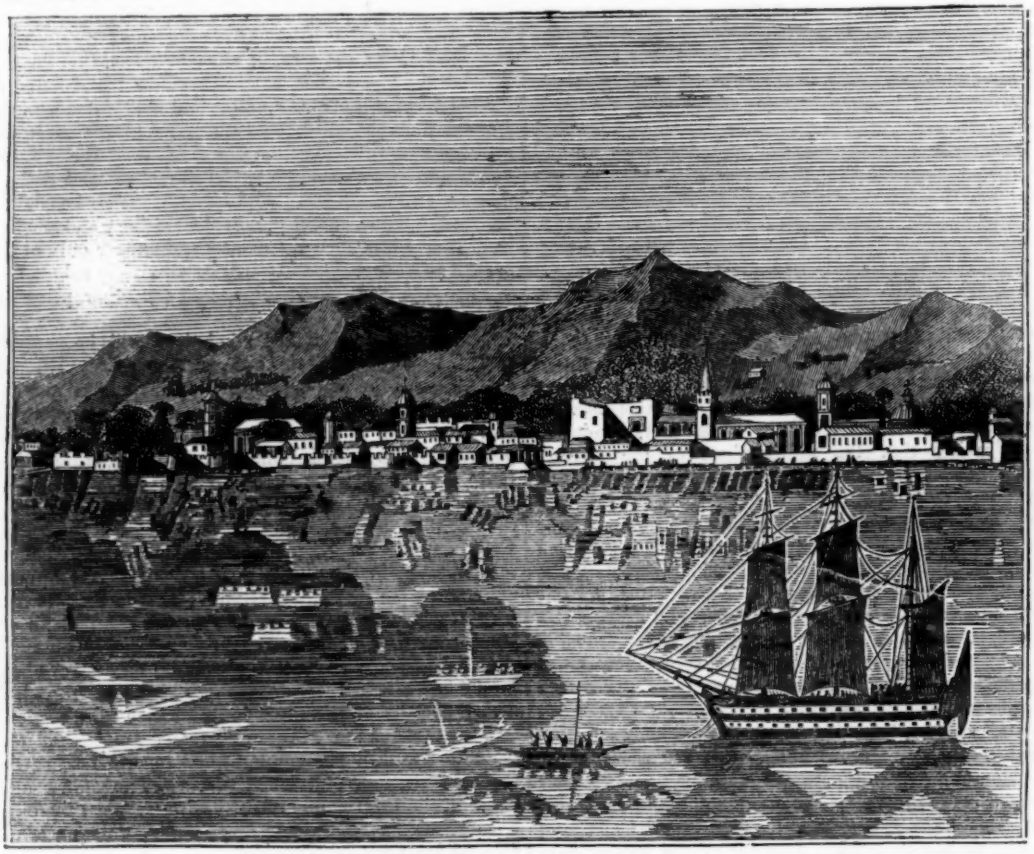
The friar then proceeds to account for the effects of the Fata Morgana, by an inclination of the surface of the sea, and its subdivision into different planes by the contrary eddies. The aërial reflections he refers to the influence of saline and other effluvia suspended in the air; but here his reasoning is far from being productive of any clear statement. He asserts, however, (what, indeed, the reason of our readers would suggest,) that all the objects exhibited in the Fata Morgana are derived from real objects on shore reflected in all senses, magnified, mingled, and multiplied without end.

A writer in Nicholson's "Journal of Science," who first made the Dominican's dissertation known in this country, derives from his account,—that by the form and situation of the Faro of Messina, the current from the south, at the expiration of which the phenomenon is most likely to appear, is so far impeded by the figure of the land, that a considerable portion of the water returns along shore;—that it is probable the same coasts may have a tendency to modify the lower portion of air in a similar manner during the southern breezes, or that a

* Travels in Sicily.

sort of basin is formed by the land, in which the lower air is disposed to become calm and motionless;—that the Morgana presents inverted images beneath the real objects, and that these inverted images are multiplied laterally as well as vertically;—that in the aërial Morgana, or vision in the air, the objects are not inverted, but more elevated than the original objects on shore;—that the fringes of prismatic colours are produced in falling vapours, and to be explained by the principles of refraction;—that it seems more probable that these magical appearances are produced by a calm sea, and one or more strata of superincumbent air, differing in refractive and consequently reflective power, than from any considerable change (as fancied by the Friar) in the surface of the water, with the laws of which we are much better acquainted than with those of the atmosphere;—that the polished surface of the water may account for the vertical repetitions; but for the lateral multiplications, recourse must be had to reflecting or refracting planes in the vapour, which appear as difficult to establish as those which have been supposed in the water.

It will be felt, from what has been said, that though the phenomenon may be referred to natural causes, some difficulty still exists as to the modes in which some of the effects are produced. This ought not to surprise us, when we reflect that the Fata Morgana in its more perfect state—or when the vision is represented both in air and water—is of rare occurrence and of very short duration, and that the inhabitants of the particular spot where it occurs are not much given to the study of natural philosophy.



[Effects of the Fata Morgana.]

The Pestilent Erysipelas.—Sauvages, (a French physician and botanist, who died in 1767,) under the head of *Erysipelas pestilens*, arranges the fatal epidemic disease, which prevailed extensively in the early and dark ages, as the sequel of war and famine, and which has received a variety of denominations; such as *ignis sacer*, *ignis Sti. Anthonii*, *mal des ardens*, *ergot*, *kriebel-krankheit*, &c. &c., according to the various modifications and degrees of severity, or according to the supposed cause of it. The erysipelatous redness, however, followed by the dry gangrene, which often destroyed the limbs joint by joint, was only one of the forms or stages of that disease; as the contracted and palsied state to which the ancients gave the name of *sceloturbe*, constituted another. Instead of originating from eating rye affected with the *ergot*, as was supposed in France, or barley with which the *raphanus* was mixed, as was imagined in Sweden, the disease was, doubtless, the result of deficient nourishment,—a severe land-scurvy, which was a great scourge of the ancient world, and often denominated *pestilence*. The name of St. Anthony seems to have been first associated with an epidemic disease of this kind, which prevailed in Dauphiné about the end of the twelfth century. An abbey, dedicated to that saint, had recently been founded at Vienne, in that province, where his bones were deposited; and it was a popular opinion, in that and the succeeding century, that all the patients who were conveyed to this abbey were cured in a space of seven or nine days; a circumstance, which the ample supply of food in those religious houses may probably satisfactorily explain.—*Bateman on Cutaneous Diseases.*

*** The Office of the Society for the Diffusion of Useful Knowledge is at 59, Lincoln's Inn Fields.

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